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IS 10497 (1983): Methods of test for determination of brimful capacity of glass containers by gravimetric method
[CHD 10: Glassware]



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Indian Standard

METHOD OF TEST FOR THE DETERMINATION
OF BRIMFUL CAPACITY OF GLASS
CONTAINERS BY GRAVIMETRIC METHOD

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Indian Standard

METHOD OF TEST FOR THE DETERMINATION OF BRIMFUL CAPACITY OF GLASS CONTAINERS BY GRAVIMETRIC METHOD

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Indian Standard

METHOD OF TEST FOR THE DETERMINATION OF BRIMFUL CAPACITY OF GLASS CONTAINERS BY GRAVIMETRIC METHOD

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 30 March 1983, after the draft finalized by the Glass Containers Sectional Committee had been approved by the Marine, Cargo Movement and Packaging Division Council.

0.2 Glass containers are subjected to temperature variations during their filling and storage operations. To account for the specified ullage in a filled container, the brimful capacity is of main significance. The determination of brimful capacity by gravimetric method given here is to avoid any misinterpretation in the specified values and the actual values. Density correction chart for water at various temperature given in Table 2 will help in calculating the capacity of the container at 4°C at which the specific gravity of water is 1.000.

0.3 In reporting the result of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS : 2-1960*.

1. SCOPE

1.1 This standard specifies method of determination of the brimful capacity of glass containers by gravimetric method for checking their compliance to the relevant specification.

2. SAMPLES

2.1 The test shall be performed with a predetermined number of containers as given in the relevant specifications.

3. METHOD OF TEST

3.1 Apparatus and Facilities

3.1.1 Weighing balance with the suitable sensitivity (see 3.2.3.1).

*Rules for rounding off numerical values (revised).

3.1.2 Appropriate laboratory glass funnel, a beaker and a pipette.

3.1.3 Laboratory thermometer.

3.2 Procedure

3.2.1 Weigh the dry empty container free from all impurities on the scale(m_1).

3.2.2 Fill container with water to the top edge (brimful capacity). The temperature of water shall not differ from the room temperature in which the measurements are taken by more than $\pm 1^\circ\text{C}$. The outside surface of the container shall be kept dry.

NOTE — Brimful is the condition in which the container standing on a horizontal surface is filled with water until the centre of the liquid meniscus is levelled with the top of the container.

3.2.3 Weigh again the container after filling (m_2).

3.2.3.1 The accuracy of weighing depends on the nominal capacity of container and shall be at least as shown in Table 1.

TABLE 1 WEIGHING ACCURACIES REQUIRED FOR THE GRAVIMETRIC DETERMINATION OF CONTAINER CAPACITIES

NOMINAL CAPACITY OF THE CONTAINER	WEIGHING ACCURACY
<i>ml</i>	<i>g</i>
Up to 10	0.2
11 to 250	0.5
251 to 1 000	1.0
1 001 to 5 000	2.0
above 5 000	10.0

3.2.4 The brimful capacity is given by the difference observed between the mass of full and empty container ($m_2 - m_1$) multiplied by the correction factor C_f corresponding to the water temperature given in Table 2.

This will give the brimful capacity of the container at 4°C.

TABLE 2 VOLUME CORRECTION FACTORS FOR WATER TEMPERATURES
(Clause 3.2.4)

WATER TEMPERATURE	CORRECTION FACTOR
°C	C _f
12	1.000 5
14	1.000 8
16	1.001 1
18	1.001 4
20	1.001 8
22	1.002 2
24	1.002 7
26	1.003 3
28	1.003 8
30	1.004 4

3.3 Test Report

3.3.1 The test report shall consist of the following data:

- Description and the number of samples and the report on the sampling plan.
- The capacity and the brimful capacity of each container with the marking on those samples which are not within the specified limits.
- The bulk volume is calculated and the relation between the individual capacity tolerance T_1 and the bulk tolerance T_n is the part of the relevant specification.

NOTE — At the same time the following principle applies :

Bulk tolerance T_n are always smaller than the individual capacity tolerances T_1 — the higher is the number of containers, the smaller are the bulk tolerances.

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

QUANTITY	UNIT	SYMBOL
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

QUANTITY	UNIT	SYMBOL
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

QUANTITY	UNIT	SYMBOL	DEFINITION
Force	newton	N	1 N = 1 kg.m/s ²
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m ²
Frequency	hertz	Hz	1 Hz = 1 c/s (s ⁻¹)
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m ²